

Radio Frequency (RF) Exposure: A Cautionary Tale

Submitted to the FCC by
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(Based on material submitted by the author to the Michigan Public Service Commission, MPSC, regarding “smart” meters.)

There is a broad issue at work here. It is evident that we are moving from a society connected by wires to a society bombarded by a rapidly increasing stream of RF (radio frequency) radiation. But as a nation we never made a conscious decision to do so. There has been no public discussion or debate and no acknowledgement of the health risk potential nor the conflict between business interests and public health.

One questions whether the FCC is the proper governmental agency to control RF/EMF standards. The current nominee to lead the organization, Tom Wheeler, used to be the head of the wireless industry association. This suggests a strong bias towards an engineering orientation at the expense of rigorous biomedical investigation.

The deployment of many RF emitting devices like smart meters has largely been a clandestine operation. Little explanation, nor any mention of the many community resolutions in opposition to smart meters, has been presented to the public or posted at DTE (metro Detroit electricity provider) or MPSC websites.

Several summary key points:

- There is a large body of biomedical evidence raising concerns about long-term, continuous exposure to RF/EMF especially for children – more than enough to invoke the Precautionary Principle and dictate an immediate halt to smart meter deployment (as had been requested by most of the petitioning communities). The Precautionary Principle shifts the burden of proof from those suspecting a risk to those who discount it.
- There is an immediate need for independent field studies to measure the output of installed smart meters and other RF emitters – in terms of signal frequency and strength. Independent research means no industry sponsorship or involvement of the testing agency. EPRI (Electric Power Research Institute) does not qualify.
- There is an immediate need to establish the baseline of current exposure to RF/EMF by the population. No organization has this data; not the government nor the utility companies. Consequences become more serious with cumulative exposure to RF/EMF. And there has been a tremendous increase in RF exposure over the past decade due to ubiquitous wireless devices including cell phones and Wi-Fi.

- Independent authorities say (in contrast to industry spokespeople):
 - Smart meters exposure is 100 times stronger than that of a cell phone when full body exposure is considered.
 - Field measurements of some smart meters show that they transmit regularly, tens of thousands of times per day.
 - In-house measurements of smart meters show them to be far stronger than advertised due to reflective surfaces as are commonly found, for example, in modern kitchens.
- The FCC safety standards used to legitimize smart meters are out of date and inadequate. Conforming to a legal standard does not necessarily make a device safe. Current permissible power levels are considerably greater in the U.S. when compared to many other countries. Some assert that a different governmental unit, perhaps the EPA or FDA, should be the sanctioning agency, not the FCC.
- The wireless industry is a \$3 Trillion a year colossus. Apple and Google quickly bring lawsuits against any entity publicly suggesting RF might be a bio-hazard. For example, they sued the city of San Francisco for requiring health and safety information be displayed at the cell phone retail point of sale. This info is the same as contained within the phone packaging. Note that Apple is often listed as the wealthiest corporation in the world; Google is in the top ten, usually seventh. Google owns everything Android and also owns the cell phone division of Motorola. And it was just announced that Microsoft will acquire Nokia's cell phone business. How are citizens to counteract these moneyed interests and their political lobbying power?
- It is inappropriate to consider a single smart meter or other RF emitting device in isolation. Electric, gas, and water utilities are planning to install their own RF meters. That's 3-4 smart meters on every house. And what about condo complexes and apartment buildings where dozens of meters are clustered close to living quarters – perhaps on the outside wall next to a baby crib. And what about the cumulative effect of all RF sources – whose level we don't even know and effects we don't understand.
- Smart meters are involuntary. Continuous exposure to RF is, as a result, mandatory, as is also true with cell towers. One chooses to use a cell phone. And one can take precautions to make those activities safer. But not with smart meters.
- Some schools have removed their Wi-Fi given the concern of negative effects – especially on young children.
- We need **objective, independent** field studies. Random samples of current baseline RF readings should be made throughout affected areas, especially high density areas. Similarly, random sample RF readings should be made near smart meters to determine the actual emission level and frequency of broadcast. This must be reported as REAL TIME measurement – no averaging, smoothing, etc. should be done. Transient spikes should in no way be suppressed.

HEALTH AND SAFETY

“Were these population-wide exposures to smart meters to be part of a project carried out in a medical setting, to test the risks and benefits of a new technology on human health and well being, it would be rejected by a Medical Institutional Review Board ... as an unethical exercise in human experimentation.”

-- Elihu D. Richter MD, MPH

http://sagereports.com/smart-meter-rf/docs/letters/Eli_Richter_CCST_-final.pdf

It is important to understand core differences in philosophy and approach that explain much of the back-and-forth arguing that takes place between smart meter and other RF proponents and those who object to the technology. That difference can be described as **“Prove It Safe” vs. “Prove It Harmful.”**

Medical and public health authorities embrace the "Prove It Safe" approach. And when in doubt they invoke the Precautionary Principle - if it might be harmful, go slow.

On the other hand, the engineering mindset leans toward “Prove It Harmful.” Engineers (and engineering firms such as utility companies, the FCC, and the IEEE) who want to deploy new technology will only stop if people, rather immediately, display harmful effects. Of course the problem here is that standard ignores long-term consequences that only show up many years later. And when money can be made, "business interests" find it easy to look the other way and ignore long-term concerns or trends.

The other core rift has to do with **what is meant by "safe."** Engineers refrain from saying a device is safe. When that word is used it is by business or PR people, often inadvertently. All engineers will do is test to see whether a device meets a standard. **There is a subtle but significant distinction between "passes or meets the standard" and "safe."** It's easy to understand how a non-technical person would assume that if a device passed then it is safe. But safe assumes the standard is rigorous and correct.

The reality is that the RF exposure standard, which comes from the FCC, is about 25 years old and even precedes the cell phone era and does not comprehend cumulative exposure. No one knows what the current average, daily exposure of RF is in our environment. Knowing that measurement would establish the **baseline** against which we could gauge RF growth. This is key because we have been rapidly increasing our exposure over the last decade. One might consider the Precautionary Principle here especially in light of ever emerging biological and medical research indicating that RF radiation does, in fact, pose a health hazard.

We've made mistakes before. Recall asbestos, lead in paint and gasoline, the drug Thalidomide (birth defects); even tanning booths, and cell phones for which cautions are now being urged (i.e., use an ear-bud or speakerphone, limit call length especially for children, etc.).

And let's not forget cigarettes, which the tobacco industry asserted for decades were safe and produced research attesting so. Later we found out that research was industry sponsored. Independent, objective research showed that tobacco was very bad for one's health – and that it created a burdensome cost to society.

There is a large body of research literature detailing the biological effects of RF/EMF. Though research in this area goes back decades, greater attention is now being paid due to the population's rapidly increasing RF exposure to wireless (e.g., broadcast radio and TV, commercial communications equipment, consumer cell phones and towers, Wi-Fi in offices, coffee shops, campuses, home, baby monitors, etc). **Current research documents non-thermal and non-ionizing biological effects– contrary to the standard industry rhetoric that only thermal sources can produce biological effects.**

Cell phone research presents us an interesting example akin to the tobacco industry. For years, industry sponsored research stated there was no problem. One way the industry hides discomfiting evidence is by diluting the data. But when the data is filtered and only users who had a history of 10 years or longer of heavy cell phone use are analyzed, it was shown that they had a significantly greater chance of developing brain tumors. (The Hardell study.)

<http://www.sott.net/articles/show/220517-Cell-Phone-Brain-Tumor-Risk-Underestimated-in-Cell-Phone-Study>

Also, the Ten-Year INTERPHONE Study:

http://bioinitiative.org/freeaccess/press_release/docs/Interphone.pdf

Smart meters are in the family of wireless devices that include cell phones. The Hardell study, like others, demonstrates the difficulty in determining the truth. In part, this is due to the long latency of symptom manifestation and the paucity of data available to medical and public health researchers. But it is also due to attempts to downplay, even hide, uncomfortable truths that threaten what has come to be a major industry. Smart meter researchers confront the same barriers as with cell phones.

Conflicting Information

There is considerable conflicting information bandied about. For example, proponents of smart meters often state that the meters emit far lower levels of RF than a cell phone and this statistic is often used to declare smart meters are safe. However, INDEPENDENT experts state smart meters emit more than 100 times the radiation of a cell phone when full body exposure is taken into consideration. This is very different that what industry sources say.

Here is a short interview with Daniel Hirsch from the University of California at Santa Cruz who says the safety data is misconstrued and that smart meters emit 100 times the radiation as a cell phone when full body exposure is considered.

<http://stopsmartmeters.org/2011/04/20/daniel-hirsch-on-ccsts-fuzzy-math/>

And here's a short video interview with Dr. David Carpenter (background: Harvard Medical School, New York Public Health Department, Dean of Public Health). He also cites the dangers of smart meters.

<http://emfsafetynetwork.org/?p=3946>

There also seems to be general disagreement about how often and at what signal strength smart meters operate. DTE (metro Detroit electricity provider) says they send usage data for about a total of 100 seconds per day. But they are careful with their language. Others state that these meters broadcast far more often, in part, because with the MESH network topology these meters are communicating with neighboring meters many times per second constantly throughout each and every day.

Here is an example of RF radiation readings near smart meters showing very high and frequent bursts – far greater than stated by the utility company:

<http://emfsafetynetwork.org/?p=3870>

Here is a short article about the many ways smart meters are in violation of safety regulations. Take note of the graphic image at the top of the page. Meter clusters like the one depicted are commonplace at apartment buildings and condo complexes. I wouldn't want my baby sleeping next to that!

http://emfsafetynetwork.org/?page_id=3653

There is also considerable contention regarding the signal strength. There is concern that reported measurement by smart meter proponents are based on averaging which smoothes out the spikes that others believe are a hazard.

The action required to reconcile these conflicts is clear: random sample field measurements of smart meters' signal strength and frequency of broadcast need to be made by objective, independent authorities. The raw data needs to be available to the public unaltered by smoothing or any other statistical manipulation. Independent research means no industry sponsorship or involvement of the testing agency. EPRI does not qualify.

Random sampled field measurements also need to be made to establish the baseline of current exposure to RF/EMF by the population. No organization has this data; not the government nor the utility companies. Consequences become more serious with cumulative exposure to RF/EMF. And there has been a tremendous increase in RF exposure over the past decade due to ubiquitous wireless devices including cell phones.

Is a smart meter a passive device that rarely broadcasts and when it does, the signal strength is low? Or is it an active device, chattering all day long and emitting strong, spikes of electrical energy? These objective field measurements are necessary to settle this matter. But the matter will not be settled unless the measurement process is beyond reproach.

EPRI vs. Sage Associates Environmental Consultants

These studies are worthy of mention because of their significance and specific focus on smart meters. Industry proponents of smart meters often cite the EPRI (Electric Power Research Institute) study but they usually fail to state that EPRI is more than 90% funded by industry companies. Though a reputable firm, one cannot overlook the influence of the funding in shaping the parameters and boundaries of the research. In fact, the EPRI study had very narrow and limited goals.

The EPRI report is touted as proving smart meters safe. EPRI is an engineering firm and subject to the "Prove It Harmful" mindset. Of greater relevance is that EPRI certified only one particular meter (Itron). That means EPRI tested it and found that it met the FCC standards. As discussed earlier, that means that the Itron meter can be deployed since it has met the **legal** requirement – but EPRI says nothing, nor is equipped to say anything, about the true safety of the device.

The Sage reports, on the other hand, demonstrated that in "real world" testing, smart meters did not even meet the FCC requirement (that many researchers consider far too

lenient). “FCC compliance violations are likely to occur under normal conditions of installation and operation of smart meters.” .And reflective surfaces as are commonly found in modern kitchens create considerable signal “bounce” and significantly increase exposure to RF. Moreover, Sage found that smart meters from other manufacturers far exceeded the Itron in RF emissions – by nearly a factor of five. (This is similar to cell phones that vary significantly in emissions by manufacturer.)

It is disingenuous on the part of the utilities to cite the EPRI study and ignore the Sage reports. But they do this regularly. Without equivocation it can be said that the Sage reports are far more rigorous and scientifically valid than the study from EPRI.

The third link below contains Sage’s comments regarding EPRI’s reaction to the Sage report. Initially EPRI defended itself and took issue with the Sage findings. However, Sage’s reply shatters the EPRI work and exposes it as the inadequate research that it is. Reference links:

<http://sagereports.com/smart-meter-rf/>

http://sagereports.com/smart-meter-rf/?page_id=429

http://sagereports.com/smart-meter-rf/?page_id=460

More Research Evidence

There are so many biological studies whose results provide a real basis for concern. Similarly, there are many public health and medical professionals, familiar with the body of research literature, who have expressed themselves publicly in the attempt to warn the global community about the potential hazards of long-term, continuous exposure to RF/EMF.

And let’s not forget that about 3% of the population is hypersensitive to RF/EMF. For these people life is made difficult and uncomfortable in as much as it may be nearly impossible to eliminate RF from their environment. Of course, placing 3-4 smart meters on their home only compounds their dilemma. DTE has been insensitive to their circumstances.

Here will be listed only a sampling of additional research references. The question is **how much evidence is required to invoke the Precautionary Principle?** If policy makers dismiss these credible sources then no amount of evidence will be convincing. Like with tobacco, the adverse health consequences are well down the road.

Benvenuto (Italy) Resolution (2006) and the Venice Resolution (2008)

These Resolutions are signed by scientists, engineers and medical doctors who have been doing EMF research and working internationally on electromagnetic fields health and safety. The combination of their training, experience and the many contributions they have made in conducting and publishing, represents hundreds of years of expertise and places them at the forefront of knowledge about EMF.

<http://www.icems.eu/>

BioInitiative Report

The report, by a preeminent panel of physicians and public health practitioners, documents adverse health effects from non-ionizing radiation (RF/EMF). This is a definitive piece of work.

<http://bioinitiative.org/freeaccess/report/index.htm>

The Board of the American Academy of Environmental Medicine

The Board opposes the installation of wireless “smart meters” in homes and schools based on a scientific assessment of the current medical literature.

<http://aaemonline.org/images/CaliforniaPublicUtilitiesCommission.pdf>

International Agency for Research on Cancer (IARC) / World Health Org.

In May, 2011, 30 scientists from 14 countries met in Lyon, France, to assess the carcinogenicity of radio frequency electromagnetic fields (RF-EMF).

“The Working Group classified RF/EMF as “possibly carcinogenic to humans” (Group 2B). This evaluation was supported by a large majority of Working Group members.”

The Lancet, June 22, 2011 (The preeminent British medical journal)

Rob States, Professional Engineer (PE)

Mr. States has a definitive lecture that covers most of the important aspects regarding smart meters and RF/EMF. He has calibrated radiation exposure and presents it in a meaningful and startling manner. The lecture is about 30 minutes and the calibration section is somewhere near the middle.

<http://www.youtube.com/watch?v=FLcTaSG2-U&feature=related>

Court-ordered study links Vatican Radio's RF to cancer risk. 7-14-10

<http://www.rbr.com/radio/engineering/tech-topics/25895.html>

A few quotes:

William Rea, MD

Founder & Director of the Environmental Health Center, Dallas

“Sensitivity to electromagnetic radiation is the emerging health problem of the 21st century. It is imperative health practitioners, governments, schools and parents learn more about it. The human health stakes are significant”.

Martin Blank, Ph.D.

**Associate Professor, Department of Physiology and Cellular Biophysics,
Columbia University, College of Physicians and Surgeons**

“Cells in the body react to EMFs as potentially harmful, just like to other environmental toxins, including heavy metals and toxic chemicals. The DNA in living cells recognizes electromagnetic fields at very low levels of exposure; and produces a biochemical stress response. The scientific evidence tells us that our safety standards are inadequate. . . we should sit up and pay attention.”

Magda Havas, Ph.D.

Associate Professor, Environment & Resource Studies, Trent University, Canada.

“Radio frequency radiation and other forms of electromagnetic pollution are harmful at orders of magnitude well below existing guidelines. Science is one of the tools society

uses to decide health policy [but] ... the science is being ignored. Current guidelines urgently need to be re-examined ... and reduced ... There is an emerging public health crisis at hand and time is of the essence."

From: Electropollution and the Decline In Health of a Nation by Alex Richards:

The US government is neither tracking the health effects of these newly adopted technologies nor has it funded a single non-classified study on the biological effects of wireless technologies since the late 1990's. During that time twelve new ubiquitous technologies have been rolled-out, including public WiFi, 3rd generation (3G) cell phones, 3G Cellular networks, Bluetooth, WiMax, DECT cordless phones, 4G cell phones and broad deployments of GPS in cars, phones and devices.

Meanwhile the fourteen international scientists, who produced the BioInitiative Report (www.bioinitiative.org) document more than two thousand, mostly independent studies, which connect wireless and other EMR with the following: DNA damage, brain cancer, Alzheimer's, breast cancer, children's cancers (leukemia), immune system dysfunction, cardiac symptoms, alteration of melatonin production, inflammation and electromagnetic sensitivity. The 630 page report also links numerous modern age symptoms such as headaches, sleep disturbances, concentration issues, fuzzy thinking, joint and muscle pain and memory loss to wireless.

In July 2010, a previously unrecognized collection of nearly 5000 studies linking low-level wireless signals to bioeffects was discovered by noted scientist, Magda Havas, PhD of Trent University in Ontario, Canada. More than 2300 of these studies, concerned with radio-frequency and microwave radiation, were compiled by Dr. Zorach Glaser, PhD, an officer in the US Navy at the request of the Naval Medical Research Institute. Many of these studies were previously classified and others originated in Eastern Block nations such as the USSR, Poland and Czechoslovakia and have only recently been translated.

Here is a sampling from Dr. Glaser's report on the 122 biological phenomena (effects) and clinical manifestations attributed to microwave and radio-frequency radiation: This treasure trove of "lost" science that was compiled at the request of the US Navy opens the door for a real renaissance in research for scientists, who are examining the link between wireless technologies and impacts to our health. But will it be enough to awaken the US government to this call to action?

Meanwhile in a spectacular announcement that got very little coverage in August 2010, noted epidemiologist, Samuel Milham, MD makes the link between the growth of electrification and the incidence of four of the big six diseases. In "Dirty Electricity: Electrification and the Diseases of Civilization." Dr. Milham connects dirty electricity with heart disease, cancer, diabetes, neurological disorders like ALS and suicide.

Dirty electricity refers to unusable electrical energy, which is caused by the interference of electronics on the power lines within your home, office or public building. It is virtually everywhere. Dirty electricity is created by fluorescent lights, dimmer switches, cell phone chargers, plasma TVs, laptop computers and the dramatic increase of electronics all around us. Seven studies have shown that what is considered electrical noise on power lines is also biologically-active. (Havas,

Milham, Morgan et al). These studies, many of which were performed in schools, shows that this electrical noise may be causing, or worsening health conditions such as Attention Deficit Disorder (ADD), chronic fatigue, diabetes (glucose rise) and asthma. Eerily four of the diseases most associated with inflammation– cancer, heart disease, diabetes and neurological disorders are directly linked to dirty electricity. Both Dr. Zorach Glaser's bibliography and the BioInitiative Report (www.bioinitiative.org) separately connect electrical fields from wireless technologies with inflammation

CONCLUSION

There is an immediate need to examine and understand the full extent of the barrage of RF that has now become a regular part of our metropolitan environments. Assumptions of the safety of the conglomeration of RF emitting devices has been a case of “burying our heads in the sand” – or perhaps a position encouraged by huge moneyed interests that would choose to keep citizens unaware of the health threat posed by long-term, continuous exposure to RF. It is past time for the government regulatory agencies to step-up and protect the public interest. We are dealing with a new form of air pollution.

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